

### 11-3 Geometric Sequences

-sequence in which each term after the first is found by multiplying the previous term by a constant (common ratio)

ex:

3, 12, 48, ...

$$r = \underline{4}$$

ex:

100, 20, 4, ...

$$r = \underline{\frac{1}{5}}$$

ex:

2, 6, 18, 54...

$$r = \underline{3}$$

Develop the formula.

$$a_2 = 2 \cdot 3 = 6$$

$$a_3 = 2 \cdot 3^2 = 18$$

$$a_4 = 2 \cdot 3^3 = 54$$

$$a_n = a_1 \cdot r^{n-1}$$

To find the nth term:

$$a_n = a_1 \cdot r^{n-1}$$

ex:

3, 9, 27, ...

$$r = 3$$

Find  $a_7$

$$a_7 = 3 \cdot (3)^6$$

$$a_7 = 2187$$

ex:

100, 25, 6.25, ...

$$r = \frac{1}{4}$$

Find  $a_5$ 

$$a_5 = 100 \left( \frac{1}{4} \right)^4$$

$$a_5 = \frac{25}{64}$$

ex:

Write an equation for  $a_n$ 

5, 10, 20, 40, ...

$$r = 2$$

$$a_n = 5(2)^{n-1}$$

ex:

$$a_7 = 1536$$

$$a_3 = 96$$

$$r = 2$$

$$a_7 = 96(2)^{(7-3)}$$

$$a_n = a_3 r^{n-3}$$

$$a_n = a_{10} r^{n-10}$$

↑  
You can adjust  
the formula

Geometric Means--terms between two given terms

ex:

Find three geometric means between 300 and  $\frac{6075}{64}$ 

$$300, -, -, -, \frac{6075}{64}$$

$$\frac{6075}{64} = 300 \cdot r^4$$

$$\left( \frac{81}{256} \right)^{\frac{1}{4}} = (r^4)^{\frac{1}{4}}$$

$$\pm \frac{3}{4} = r$$

225	$\frac{675}{4}$	$\frac{2025}{16}$
-225	$\frac{675}{4}$	$\frac{-2025}{16}$

DO:

Find three geometric means between -3 and -12,288

$$-12288 = -3r^4$$

$$4096 = r^4$$

$$\pm 8 = r$$

$$\pm 24, -192, \pm 1536$$

HW

p591

15, 17, 21, 23, 31- 39odd, 38, 43, 45